

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Steve W. Hepler

Serial No.: 08/715,869

Filed: September 19, 1996

For: METHOD AND APPARATUS FOR
TESTING INTEGRATED CIRCUITS

Confirmation No.: 5113

Examiner: J. Rodriguez


Group Art Unit: 3653

Attorney Docket No.: 2269-2972US

CERTIFICATE OF TRANSMISSION

I hereby certify that this correspondence is being facsimile transmitted to the
Commissioner for Patents (Fax No. (703) 746-3678) on the date shown below.

September 16, 2004
Date


Signature

Bradley B. Jensen
Name (Type/Print)

PROPOSED AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following communication is in response to the telephonic conference between
Applicant's undersigned attorney and Examiner Rodriguez on September 14, 2004.

A listing of the claims begins on page 2 of this communication.

Remarks begin on page 13 of this communication.

Best Available Copy

Listing of Claims

The following listing of claims replaces all previous listings of claims and is set forth in the format requested by the United States Patent and Trademark Office in a telephonic conference with Applicant's undersigned attorney on September 14, 2004.

1. (Original) An integrated circuit testing apparatus for testing an integrated circuit leaving an IC singulation station, comprising:
 - a) a receiving means positioned in a pre test position for receiving the integrated circuit from the IC singulation station;
 - b) a testing site, positioned to secure the integrated circuit after a displacement of said receiving means to a test position, the displacement positioning said integrated circuit in said testing site said test site having a test connection for making physical contact with said integrated circuit when it is secured in said testing site, a circuit test performed on said integrated circuit when it is secured in said testing site; and
 - c) a holding station having a first post test position and a second post test position, said holding station receiving the integrated circuit in said first post test position from the receiving means following a return of the receiving means to said pre test position subsequent to the performing of the circuit test the integrated circuit;
 - d) a first track for receiving the integrated circuit from the holding station when the holding station is in said first post test position and when the circuit test determines that the integrated circuit has a first test condition; and
 - e) a second track for receiving the integrated circuit from the holding station when the holding station is in said second post test position, said second test position attained when said receiving means returns to said test position, said second track receiving the integrated circuit when the circuit test determines that the integrated circuit has a second test condition.
2. (Original) The apparatus of claim 1, wherein the holding station further comprises:
a control pin for retaining the integrated circuit in the first post test position, when the integrated

Serial No. 08/715,869

circuit has said second test condition, and for releasing the integrated circuit from the first post test position to said first track when said integrated circuit has said first test condition, and for releasing said integrated circuit from said second post test position to said second track when said integrated circuit has said second test condition.

3. (Original) A method for testing an integrated circuit in a testing apparatus after a departure of the integrated circuit from an integrated circuit singulation apparatus comprising the steps of:

- a) moving the testing apparatus to a loading position;
- b) loading the integrated circuit into the testing apparatus;
- c) moving the testing apparatus to a test position to position the integrated circuit for testing;
- d) performing electrical tests on the integrated circuit to provide a tested integrated circuit having identified first and second test conditions;
- e) moving the testing apparatus from the test position to position the tested integrated circuit for unloading;
- f) moving the tested integrated circuit to a first unloading position;
- g) unloading the tested integrated circuit from the first unloading position to a first track when it has said first test condition;
- h) moving the tested integrated circuit to a second unloading position when it has said second test condition; and
- i) unloading the tested integrated circuit from the second unloading position to a second track when it has said second test condition.

4. (Original) The method as specified in claim 3, further comprising moving said testing apparatus to said test position during said step of moving the tested integrated circuit to said second unloading position.

Serial No. 08/715,869

5. (Currently Amended) A testing apparatus for controlling positioning of a circuit before, during and after a circuit test is performed on the circuit, the circuit test determining a first and a second test condition of the circuit, the apparatus comprising:

- a) a positioning apparatus having a first port and a second port and [capable of displacement to] a first position and a second position, said first port receiving the circuit for testing;
- b) a testing apparatus for securing said circuit during a testing of the circuit, said positioning apparatus displaced to said second position during testing;
- c) a testing control pin for retaining said circuit in said first port prior to the testing and for allowing a transfer of said circuit from said first port to said second port subsequent to the testing;
- d) a first track for receiving said circuit from said second port when said circuit test finds said circuit to have the first test condition, said positioning apparatus being in said first position; and
- e) a second track for receiving said circuit from said second port when said circuit test finds said circuit to have the second test condition, said positioning apparatus being in said second position.

6. (Original) The apparatus as specified in claim 5, further comprising an unloading control pin for retaining said circuit in said second port when said circuit test finds said circuit to have said second test condition and said testing apparatus is in said first position and for allowing a release of said circuit to said first track when said circuit test finds said circuit to have said first test condition and for allowing a release of said circuit to said second track when said circuit test finds said circuit to have said second test condition.

7. (New) An integrated circuit testing apparatus for testing an integrated circuit leaving an integrated circuit singulation station, comprising:

Serial No. 08/715,869

a receiving apparatus positioned to receive untested integrated circuits from the integrated circuit singulation station;

a testing apparatus positioned to receive the untested integrated circuits from the receiving apparatus and test the integrated circuits to identify defective integrated circuits and non-defective integrated circuits, the testing apparatus including a holding station moveable with the testing apparatus, a first position, and a second position, the testing apparatus while in the first position allowing tested integrated circuits to proceed to the holding station and allowing untested integrated circuits to be received from the receiving apparatus; and

a separating apparatus connected to the testing apparatus to separate defective integrated circuits from non-defective integrated circuits after testing thereof, the separating apparatus including a first track for receiving integrated circuits from the holding station in the first position, and a second track for receiving integrated circuits from the holding station in the second position.

8. (New) The apparatus of claim 7, wherein the testing apparatus while in the second position will electrically test the integrated circuit.

9. (New) The apparatus of claim 8, further comprising:
the holding station while in the first position holding defective integrated circuits from proceeding to the separating apparatus, and allowing non-defective integrated circuits to proceed to the first track of the separating apparatus; and
the holding station while in the second position releasing defective integrated circuits to the second track of the separating apparatus.

10. (New) An integrated circuit testing apparatus for testing an integrated circuit leaving an integrated circuit singulation station, comprising:
a loading apparatus for supplying the integrated circuit leaving the integrated circuit singulation station to the integrated circuit testing apparatus;

Serial No. 08/715,869

a receiving apparatus positioned to receive untested integrated circuits from the integrated circuit singulation station;

a testing apparatus positioned to receive the untested integrated circuits from the receiving apparatus and test the integrated circuits to identify defective integrated circuits and non-defective integrated circuits, the testing apparatus including a holding station, a first position, and a second position, the testing apparatus while in the first position allowing tested integrated circuits to proceed to the holding station and allowing untested integrated circuits to be received from the receiving apparatus; and

a separating apparatus connected to the testing apparatus to separate defective integrated circuits from non-defective integrated circuits after testing thereof, the separating apparatus including a first track for receiving non-defective integrated circuits from the holding station in the first position and a second track for receiving defective integrated circuits from the holding station in the second position.

11. (New) The apparatus of claim 10, wherein the testing apparatus while in the second position will electrically test the integrated circuit.

12. (New) The apparatus of claim 11, further comprising:
the holding station while in the first position holding defective integrated circuits from proceeding to the separating apparatus, and allowing non-defective integrated circuits to proceed to the first track of the separating apparatus; and
the holding station while in the second position releasing defective integrated circuits to the second track of the separating apparatus.

13. (New) A method of testing an integrated circuit in a testing apparatus having a test site, a holding station, a non-defective integrated circuit track, a defective integrated circuit track, a first position, and a second position, after the singulation of the integrated circuit in an integrated circuit singulation apparatus, the method comprising:
transferring the integrated circuit from the integrated circuit singulation apparatus;

Serial No. 08/715,869

receiving the integrated circuit at the testing apparatus while the testing apparatus is in the first position;

moving the testing apparatus to the second position;

testing the integrated circuit to identify defective and non-defective conditions of the integrated circuit;

moving the testing apparatus to the first position to allow the tested integrated circuit to proceed to the holding station in a first unloading position while receiving a second singulated integrated circuit into the testing apparatus;

allowing non-defective integrated circuits to proceed to the non-defective integrated circuit track from the first unloading position; and

moving the holding station to a second unloading position and allowing defective integrated circuits to proceed to the defective integrated circuit track.

14 and 15. (Cancelled)

14 ~~16~~ (New) A method of testing an integrated circuit after the singulation thereof using a testing apparatus having a test site, a holding station, a non-defective integrated circuit track, a defective integrated circuit track, a first position, and a second position, the method comprising: transferring the integrated circuit from the integrated circuit singulation apparatus; receiving the integrated circuit at the testing apparatus while the testing apparatus is in the first position; moving the testing apparatus to the second position; testing the integrated circuit thereby identifying defective and non-defective conditions thereof; moving the testing apparatus to the first position after testing of the integrated circuit; allowing the tested integrated circuit to proceed to the holding station in a first unloading position; receiving a second singulated integrated circuit into the testing apparatus while in the first position; unloading non-defective integrated circuits to the non-defective integrated circuit track from the first unloading position; and

Serial No. 08/715,869

moving the holding station to a second unloading position and unloading defective integrated circuits to the defective integrated circuit track.

17 and 18. (Cancelled)

15

~~19~~ (New) A method of testing an integrated circuit in a testing apparatus having a test site, a holding station, a non-defective integrated circuit track, a defective integrated circuit track, a first position, and a second position, after the singulation of the integrated circuit in an integrated circuit singulation apparatus, the method comprising:
receiving the integrated circuit at the testing apparatus while the testing apparatus is in the first position;
moving the testing apparatus to the second position;
testing the integrated circuit to identify defective and non-defective conditions of the integrated circuit;
moving the testing apparatus to the first position to allow the tested integrated circuit to proceed to the holding station in a first unloading position while receiving a second singulated integrated circuit into the testing apparatus;
allowing non-defective integrated circuits to proceed to the non-defective integrated circuit track from the first unloading position; and
moving the holding station to a second unloading position and allowing defective integrated circuits to proceed to the defective integrated circuit track.

20 and 21. (Cancelled)

16

~~22~~ (New) A method of testing an integrated circuit after the singulation thereof using a testing apparatus having a test site, a holding station, a non-defective integrated circuit track, a defective integrated circuit track, a first position, and a second position, the method comprising:
receiving the integrated circuit at the testing apparatus while the testing apparatus is in the first position;
moving the testing apparatus to the second position;

Serial No. 08/715,869

testing the integrated circuit thereby identifying defective and non-defective conditions thereof;
moving the testing apparatus to the first position after testing of the integrated circuit;
allowing the tested integrated circuit to proceed to the holding station in a first unloading
position;
receiving a second singulated integrated circuit into the testing apparatus while in the first
position;
unloading non-defective integrated circuits to the non-defective integrated circuit track from the
first unloading position; and
moving the holding station to a second unloading position and unloading defective integrated
circuits to the defective integrated circuit track.

23 and 24. (Cancelled)

17

25. (New) An apparatus for testing singulated integrated circuits, comprising:
a testing apparatus movable between a first position and a second position receiving untested
integrated circuits while in the first position and identifying first and second test
conditions of an integrated circuit while in the second position;
a holding station coupled to the testing apparatus and movable between the first position and the
second position, the holding station receiving tested integrated circuits from the testing
apparatus while in the first position and releasing tested integrated circuits having the first
test condition while at the first position and releasing tested integrated circuits having the
second test condition while at the second position;
a first track for receiving tested integrated circuits having the first test condition from the holding
station when the holding station is at the first position; and
a second track for receiving tested integrated circuits having the second test condition from the
holding station when the holding station is at the second position.

Serial No. 08/715,869

18 ~~26~~ (New) The apparatus of claim 25, wherein the testing apparatus and the holding station include at least one integral member moveable between the first position and the second position.

19 ~~27~~ (New) A method of testing singulated integrated circuits in a testing apparatus having a first position, a second position, a first integrated circuit track, a second integrated circuit track, and a holding station, comprising:
receiving an untested, singulated integrated circuit into the testing apparatus while in the first position;
moving the untested, singulated integrated circuit to the second position;
testing the untested, singulated integrated circuit to determine first and second test conditions thereof;
moving the tested, singulated integrated circuit back to the first position;
allowing the tested, singulated integrated circuit to move to the holding station in the first position;
receiving another untested, singulated integrated circuit into the testing apparatus while in the first position;
releasing tested, singulated integrated circuits having the first test condition to the first integrated circuit track while the holding station is in the first position; and
releasing tested, singulated integrated circuits having the second test condition to the second integrated circuit track while the holding station is in the second position.

28. (Cancelled)

20 ~~29~~ (New) An apparatus for testing singulated integrated circuits, comprising:
a loading apparatus for supplying an integrated circuit leaving an integrated circuit singulation station to the apparatus;
a testing apparatus movable between a first position and a second position for receiving untested integrated circuits while in the first position and identifying first and second test conditions of an integrated circuit while in the second position;

Serial No. 08/715,869

a holding station coupled to the testing apparatus and movable between the first position and the second position, the holding station receiving tested integrated circuits from the testing apparatus while in the first position and releasing tested integrated circuits having the first test condition while at the first position and releasing tested integrated circuits having the second test condition while at the second position;

a first track for receiving tested integrated circuits having the first test condition from the holding station when the holding station is at the first position; and
a second track for receiving tested integrated circuits having the second test condition from the holding station when the holding station is at the second position.

21 ~~30~~ (New) The apparatus of claim 29, wherein the testing apparatus and the holding station include at least one integral member moveable between the first position and the second position.

22 ~~31~~ (New) A method of testing singulated integrated circuits in a testing apparatus having a first position, a second position, a first integrated circuit track, a second integrated circuit track, and a holding station, comprising:
transferring the integrated circuit from the integrated circuit singulation apparatus;
receiving an untested, singulated integrated circuit into the testing apparatus while in the first position;
moving the untested, singulated integrated circuit to the second position;
testing the untested, singulated integrated circuit to determine first and second test conditions thereof;
moving the tested, singulated integrated circuit back to the first position;
allowing the tested, singulated integrated circuit to move to the holding station in the first position;
receiving another untested, singulated integrated circuit into the testing apparatus while in the first position;
releasing tested, singulated integrated circuits having the first test condition to the first integrated circuit track while the holding station is in the first position; and

Serial No. 08/715,869

releasing tested, singulated integrated circuits having the second test condition to the second integrated circuit track while the holding station is in the second position.

32. (Cancelled)

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.